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THE DEFENSE INDUSTRIAL BASE
EXECUTIVE SUMMARY

Vol. 1

August 1977

Harold E. Bertrand

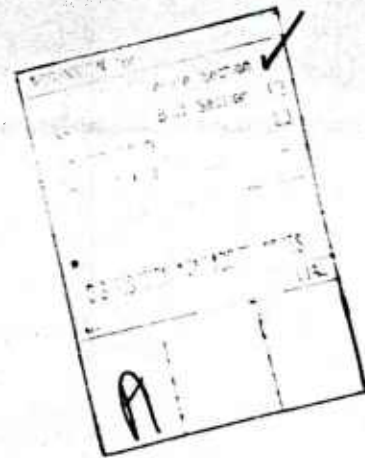


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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
I. INTRODUCTION	1
Background	1
Definitions	2
II. FINDINGS	4
Diversity of the DIB	4
Trends in Product Demand	5
Profitability of Defense Business	6
Investment in the DIB	8
DIB Perceptions of the Defense Customer	9
Productive Capacity of the DIB	11
Changing DIB Composition	12
III. CONCLUSIONS	13



I. INTRODUCTION

Background

The Defense Industrial Base (DIB) is defined as those companies that supply the material needs of the peacetime armed services. In wartime, the definition is expanded to include all potential suppliers of war material. The data and analyses presented in this report are limited to current suppliers; reserve, surge or total mobilization capacities that could be employed in the event of hostilities are not addressed.

The period covered, 1967 through 1974, was characterized by pronounced inflation. At the same time, the increasing sophistication of weapon systems was causing prices to increase. Additionally, some major weapon system procurement programs were expanding rapidly to overcome large inventory shortages and to upgrade obsolete equipment. The two most prominent such programs were the M60A1 tank program and the Navy's fleet modernization program. With fiscal resources limited, the expansion of such major procurement programs affected others adversely.

It has become common practice in Government circles to label industry changes that inhibit achievement of Government goals as "erosion." In the context of Department of Defense (DoD) procurement, that term takes its meaning from those criteria used to measure the progress of programs - Performance, Schedule, and Cost. When the DoD cannot obtain the required system performance in a timely manner and at a reasonable price, erosion is said to exist.

Reaching judgments about erosion of the DIB is complex; often conclusions are formulated on the basis of problems encountered in single procurements, and the findings can be interpreted differently by the DoD and industry. For example, the Army's inability to procure a sharply increased number of tank turrets and hulls in 1973 was, to the DoD, a clear case of erosion. To industry, from which the Army had been procuring

approximately 360 sets of tank castings annually, it was simply sound business to convert excess foundry capacity to other uses or to divest itself of the unused facilities.

We have sought to find better criteria for determining the existence of erosion by analyzing financial, sales, investment, and labor data from more than 100 Defense contractors. Information from Government agencies, financial institutions, and such organizations as The Conference Board supplemented those data. Opinions about the advantages and disadvantages of participation in the DIB were obtained from the participating companies and selected financial institutions.

Throughout the period of rising inflation and increased weapon system sophistication from 1967 through 1974, the DoD relied upon increased industrial productivity to offset the trend toward higher prices. Since productivity is influenced primarily by prudent capital investment, we targeted industry investment for Defense business as a major area of investigation.

Early discussions with industry revealed that most companies retain financial data in active files for only five to eight years. The records are then placed in archives and become costly to retrieve. Our study was thus limited to data from 1967 through 1974 (the latter being the last year complete corporate data were available at the time of the collection effort). That period began with large-scale buys in support of combat operations and ended with peacetime procurement. The resultant distortion of trends in demand for such items as ammunition should be kept in mind by the reader.

Definitions

- | | |
|-------------------------------|--|
| Defense Sales (Business) | - Prime and subcontract Government sales subject to renegotiation. Includes Foreign Military Sales (FMS) handled by the DoD. Also called Renegotiable Sales. |
| Commercial Sales (Business) | - All company sales not included in Defense Sales definition. |
| Low-Percent-Defense Companies | - Companies whose Defense sales were no more than 15% of total company sales. |

**High-Percent-Defense
Companies**

- Companies whose Defense sales were no less than 45% of total company sales.

Return on Investment (ROI)

- Before-tax profit on stockholders' equity plus long-term debt.

Return on Assets (ROA)

- Before-tax profit on total company assets.

Cost of Capital

- Weighted average rate of earnings on cost of equity shares and interest on long and short term debt.

II. FINDINGS

Diversity of the DIB

The DIB is not homogeneous. There are marked differences in the structure of its component sectors, such as Ships, Aircraft, and Ammunition; companies within a sector can differ substantially with respect to such factors as size, investment policy, and diversity of product mix. Still, those companies deriving the majority of their sales from Defense business do exhibit similar behavior, which contrasts significantly with that of companies deriving only a minor share of their sales from the DoD.

Companies whose business is derived mostly from commercial sales constitute an important part of the DIB; approximately 50% of the Defense hardware procurement dollar goes to such contractors. Those companies, however, regard Defense orders primarily as supplements to their principal markets. They are unlikely to adjust their business strategies significantly in response to changes in Defense procurement requirements and regulations. In general, commercially oriented companies' interest in Defense sales depends on the overall level of business activity. They may seek additional DoD business to employ otherwise unused capacity in times of economic stagnation or recession. In good times, though, if they perceive the costs or difficulties of doing business with DoD as excessive or procurement regulations as onerous, they may strive to minimize Defense sales or even drop out of the DIB altogether. Data on the number of companies that have taken the latter course were not available, but the percentage of Defense business done by commercially oriented companies, relative to total sales, dropped from more than 10% in 1967 to less than 5% in 1974.

High-percent-Defense contractors normally do not have that option. Their existence is dependent on orders from the Defense customer. Although their corporate objectives are in theory similar to those of other private companies, their behavior is significantly

different. Frequently, they will accept a low ROI, or even a non-catastrophic loss, to maintain or increase Defense sales. Moreover, the efforts of Defense oriented companies to diversify their markets over the period covered by this report have not seemed markedly successful overall. Their commercial sales rose only from 16% to 22% of total sales between 1968 and 1974.

Since high-percent-Defense companies must be sensitive to changes in DoD procurement incentives and penalties in order to survive, they are the element of the DIB on which DoD leverage can most effectively be exerted on such matters as capital investment for enhanced productivity and reduced cost. Incentives must, however, be tailored to the differing problems of the various sectors and even to specific members of the DIB.

Trends in Product Demand

In the DIB, as in all economic sectors, the volume of present and forecast product demand is one of the most significant factors influencing management decisions. On an overall basis, the demand trend has been unfavorable for the period covered by this report, partially as a result of the termination of combat operations in Indochina. In current dollars, a 16% drop in the value of DoD prime contracts from 1968 through 1974 was more than offset by a sharp rise in FMS. However, that was also a period of marked inflation, with price index rising from 100 to 163 between 1968 and 1974. In constant dollars, the change appears decidedly different—a decline of more than 30%.

- The 30% decline in demand did not occur uniformly across all sectors of the DIB. The share of total awards represented by Ships doubled from 8% to 16% between 1967 and 1975, and the increase in their dollar value virtually offset the impact of inflation. In contrast, Ammunition procurements declined precipitously in both current and constant dollars as a result of the end of the Vietnam War. Ammunition awards represented 19% of total procurements in 1969, but only 6% in 1975. Aircraft, Missiles, Vehicles, Weapons,

and Electronics procurements all experienced slight growth in current dollar value as a consequence of increased foreign demand; but their constant dollar trend has been downward.

- Demand for military hardware has been volatile over the period covered by this report. This is especially so for foreign sales, in which procurements in the Ships category jumped from 2% to 20% of total foreign demand between 1973 and 1975. However, the DoD market has also experienced significant shifts over relatively brief periods. For example, Ships procurements rose in terms of current dollars from \$2.1 billion in FY 1973 to \$3.5 billion in FY 1975. Ammunition procurements declined from \$2.2 billion in FY 1973 to \$1.3 billion in FY 1975.

- Seventy-one percent of the low-percent-Defense contractors surveyed indicated that, on an overall basis, Defense business was less stable and less predictable than commercial business. That perception was attested by analysis of the deviation of annual sales from sales trend lines for the companies. The average deviation of their commercial sales from the trend line was approximately 7%, while for Defense sales it exceeded 18%.

- A substantial majority of both high- and low-percent-Defense contractors (64% and 70%, respectively) expect the Defense share of their total business to decline over the next five years.

Profitability of Defense Business

This analysis of the profitability of Defense business is the latest in a series of Logistics Management Institute (LMI) examinations on that subject.¹ It focuses on ROI and ROA, as well as Return on Sales. Each of the previous studies indicated lower profitability on Defense business than on commercial business and raised questions about

¹Study of Profit or Fee Policy, LMI Task 62-14, 15 January 1973 (AD 472965).
Defense Industry Profit Review, Vols. I and II, LMI Task 66-25, November 1967 (AD 664700, 664701).
Defense Industry Profit Review, LMI Task 69-1, March 1969 (AD 685071).
Defense Industry Profit Review - 1968 Profit Data, LMI Task 69-27, March 1970 (AD 703303).

the willingness of investors to continue risking their funds in the DIB. The results of this study generally support the findings of its predecessors.

- The commercially oriented companies indicated they sought approximately 14% return on Defense sales before taxes - just as they did for commercial business. In contrast, the high-percent-Defense contractors anticipated no more than 10.5%. Actually, both groups achieved approximately the same result, 3.5 to 4% return on Defense sales.

- The total profit to sales ratios achieved by the high-percent-Defense manufacturers averaged only slightly more than 4%, in comparison with nearly 9% for the low-percent-Defense firms.

- ROI for the Defense oriented businesses was lower than that for the commercially oriented ones in each year. Over the whole period, the former averaged 8.8% in comparison to 12.7% for the latter.

- The rate of return earned on total company assets (ROA) also indicates that the commercially oriented firms did better. In all years except 1972, the ROA for this group was higher than that of the high-percent-Defense contractors. Over the entire period, the former averaged an 8.2% ROA in comparison with 5.9% for the latter.

- Within the Defense-dominated sector, both the ROI and ROA of small companies were much higher than those earned by the large companies (in fact, frequently exceeding the return achieved by commercially oriented concerns). That difference appears to be attributable largely to heavy utilization of Government-owned equipment by small Defense oriented firms.

- In general, a prudent management policy favors utilization of currently available assets for production of low profit items and reserves new investment for those areas that have historically shown the best ROI and ROA. The examination of sales to assets ratios indicates that high-percent-Defense contractors practice close asset management. As a

group, they generated more than double the sales to assets ratio of the low-percent-Defense firms (2.39 as contrasted to 1.10).

Investment in the DIB

As in all manufacturing activities, prudent investment in capital goods is the key to increased productivity in the DIB. Nevertheless, substantial evidence exists that Defense oriented contractors have in fact invested in new equipment at a lower rate than their commercially oriented counterparts during the period covered by this report.

- In every year from 1967 through 1974, commercially oriented concerns had a higher ratio of new equipment investment to equipment depreciation than did companies with high percentages of Defense sales. When averaged over the entire period, the difference was 17%.

- The ratio of equipment net book value to sales for commercially oriented concerns exceeded that for high-percent-Defense companies by a wide margin. Even after adjustments reflecting the latter's use of Government-owned facilities and leased equipment, there was still a spread in favor of the commercially oriented firms.

- More than 70% of the companies surveyed expressed greater willingness to make capital investment in commercial business than in Defense business. Less than 2% preferred investment in Defense work.

- Data from the industry survey indicate that high-percent-Defense companies may be considerably more labor-intensive than commercially oriented companies. A breakdown of the sales dollar among material, direct labor, indirect labor and other costs shows the labor costs of the high-percent-Defense manufacturers to be nearly a third greater than those experienced by the commercially oriented companies. Some portion of this difference may be attributable to the special costs of doing Defense business, such as elaborate quality control inspections and tests. Still, the fact that the labor spread between high and low-percent-Defense manufacturers is almost as large for their

commercial products as for their military items suggests a difference in corporate attitudes toward capital/labor trade-offs.

- Recent DoD action to provide profit incentives under the provisions of Defense Procurement Circular (DPC)-76-3² may stimulate contractor interest in cost-reducing investment for Defense production. It seems likely, however, that further policy initiatives along the lines suggested in Investment Policy for Cost Reduction,³ will be required, in order to protect the contractor adequately against the risks of incurring high fixed charges in the face of relatively unstable and unpredictable demand.

DIB Perceptions of the Defense Customer

The responses to LMI's questionnaire revealed that, in general, the DIB considers the Defense customer a difficult client, who often uses his monopsonistic powers inefficiently and unfairly to the detriment of industry's interests and ultimately of those of the Government itself. These perceptions may be at least partially erroneous, but there is no reason to suspect their sincerity. The presumably more dispassionate money managers surveyed for LMI by The Conference Board also took a negative view of Defense as a customer, strongly favoring investment in commercially oriented firms.⁴ The more important observations made in response to LMI's questionnaire are summarized in the following paragraphs.

- Companies doing Defense business incur much Government interference in their management as well as the imposition of excessive and expensive administrative and technical controls. In this connection, industry estimated that the cost of doing Defense business, at both the prime and subcontract levels, is more than twice as great as that associated with commercial contracts.

²See Profit '76 Summary Report, Department of Defense, 7 December 1976.

³Report on LMI Task 76-9, 30 December 1976.

⁴The Defense Industry: Some Perspectives from the Financial Community, Conference Board Report 693 (New York: The Conference Board, 1976).

- The uncertainty of future business as a result of single-year funding was of particular concern to high-percent-Defense contractors. They stated that they were denied planning visibility while being forced to risk their own capital for long lead time items that would be needed only if anticipated procurements materialized. Seventy-eight percent of all industrial respondents felt that Defense business was riskier than commercial business. Two-thirds of the Defense procurement officials queried in connection with the Profit '76 study agreed with them.⁵

- The low profitability of Defense business was another recurrent theme. Sixty-nine percent of the questionnaire respondents said that the Weighted Guidelines (WGL) approach⁶ is not sufficiently flexible to provide adequate profit. More than a third of them reported that the WGL, as generally applied, tend to depress negotiated contractor profit; 46% said that they have no effect; and only 19% stated that they increased profit.

- All industrial respondents believed that the cost-based DoD procurement system pressured Government contracting officers to keep negotiated profit down. A substantial majority of the Government contracting officers surveyed agreed with that view.

- Closely allied to the profitability issue were industry grievances over the Armed Services Procurement Regulation non-allowability of certain costs, such as interest. In addition, it was claimed that depreciation allowances for new investments were inadequate and that industry was often denied an adequate share of cost-savings from investment in productivity.

- Industry also cited a number of procurement practices which it perceived as unfair: permitting buying-in, restricting bids to "qualified bidders," violating constraints on access to contractor information in competitive procurements, using excessively long

⁵ Profit '76 Summary Report, Exhibit II, Pages III-24 to III-31.

⁶ Armed Services Procurement Regulation 3-808.

periods to evaluate proposals and to negotiate contracts, and calling for "Best and Final Offers."

So long as the DIB holds such views, members who can will lessen their reliance on the Defense market. It should also be anticipated that they will be hesitant to incur, at their own risk, substantial fixed charges for new investment in capital goods for Defense work.

Productive Capacity of the DIB

In the face of declining Defense hardware demand, below-average profitability and the litigious relationship that has prevailed between the Government and significant elements of the DIB, it would be surprising if corporate decision-makers had not striven to diversify into more rewarding fields or, in some cases, to cease competing for Defense business. This has already occurred to some degree among low-percent-Defense contractors.

There is also no question that the departure of some companies from the DIB can pose, or already has posed, procurement problems for the military services. For example, after M-60 tank hull and turret production facilities had been cut back to conform to a 30-unit per month procurement program, the Army experienced great difficulty in inducing contractors to expand their foundry capacities enough to increase production to 100 units per month to compensate for the losses resulting from the 1973 Arab-Israeli War. As a last resort, the Army had to fund equipment to activate unused foundries under the constraints of the Environmental Protection Agency and the Occupational Safety and Health Administration. This added significantly to the cost of the M-60 tank program.

It would be unreasonable to expect any company to maintain facilities and a skilled labor force at its own expense to meet a possible surge requirement or an increase in demand which is suspect of being short-lived. If the Government wishes to maintain excess capacity in the DIB as a hedge against the uncertainty of future requirements, it must expect to pay a premium for that insurance.

In actuality, from 1967 to 1974 there was considerable unused capacity in all segments of the DIB except Ships.⁷ Moreover, the shipbuilding industry's new commercial orders have diminished to such an extent that there may be substantial excess capacity for all but nuclear ship construction by 1978 or 1979. Manufacturers in the Aircraft, Missiles, and Electronics categories indicated a 61-62% utilization rate, those in the Ammunition category 49%, and those in the Tank/Automotive category 39%, on the basis of a peak capacity of two eight-hour shifts, six days a week.

Changing DIB Composition

High-percent-Defense manufacturers have tried to expand into the commercial marketplace, but have had little success in doing so. They still rely on the Armed Services for nearly 80% of their business and derive some additional portion of their revenues from direct foreign sales of military items. In contrast, the commercially oriented companies in the DIB drastically reduced their dependence on Defense business from 10.5% of their total sales in 1968 to less than 5% in 1974.

Defense business has thus become more concentrated in the high-percent-Defense companies. The trend might well continue because companies with low market shares can more easily entertain the option of withdrawing from the market when problems arise. And special procurement problems, such as those in the tank forgings case, have been more common among low-percent-Defense firms.

⁷See, for example, Joint Department of Defense/Office of Management and Budget Aircraft Industry Capacity Study, DW 77-1, January 1977.

III. CONCLUSIONS.

1. The uniform application of a single set of procurement policies, incentives, and penalties across the diverse spectrum of corporations comprising the DIB is likely to produce less than optimal results.

2. Firms deriving the greater part of their resources from Defense procurement contracts are the portion of the DIB that can most effectively be influenced by changes in Defense procurement incentives and penalties. Despite their articulated dissatisfaction with the profitability of their Defense business, they represent a stable element. There are indications that, on an overall basis, their primary interest lies in maintaining or increasing their sales in the Defense market rather than achieving a high return on sales.

3. Procurement policies designed to stimulate greater participation in the DIB by commercially oriented firms should be based on the recognition that these concerns will seek or avoid Defense business according to conventional economic considerations—particularly the relative profitability of Defense business in comparison to their commercial sales. They are unlikely to make significant adjustments in their business strategies to conform to Defense procurement objectives and regulations.

4. The decline in Defense procurement demand from 1967 to 1974 has unavoidably had an adverse effect on the interest of commercially oriented firms in Defense contracts.

5. The low profitability of Defense business relative to that of commercial sales has motivated low-percent-Defense contractors to concentrate on expansion of their commercial markets.

6. Companies dependent for their survival on Defense contracts manage their assets closely and limit new investment as a hedge against the uncertainties of future Defense business. Their response to the investment incentives of DPC 76-3 is likely to be

passive without adequate protection against the risk of incurring new fixed charges in the face of what they perceive as relatively unstable and unpredictable demand.

7. Perceived ineffectiveness and inequity in implementation of procurement policy diminish confidence in the Defense procurement process and foster an adversarial DoD/Industry relationship. An example is reaction to the Weighted Guidelines, which a majority of DIB companies believe to be applied so as to be counterproductive or of no effect in assuring adequate profitability.

8. Because of declining and unstable demand, low profitability, and industry perception of the DoD as a difficult customer, some erosion of the DIB has been inevitable. One sign of this erosion is the low rate of DIB investment in productivity-enhancing capital goods. The consequent reliance on labor-intensive manufacturing techniques probably has had an adverse effect on the costs of Defense systems.

9. Sufficient capacity to meet programmed demand still exists in most sectors of the DIB, but profit-motivated concerns cannot be expected to maintain, at their own risk, a capability for infrequent and temporary surges in production. If any of the Military Services needs to insure itself against such contingencies, it must expect to pay the premium.

10. The most ominous indicator of possible further erosion of the DIB is the fact that commercially oriented concerns now rely on Defense contracts for only 4.8% of their total sales. So small a share of total business could be dropped without significant impact on corporate financial performance in the event of poor Defense business profitability or other dissatisfaction with defense customers.

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) An executive summary of LMI's Defense Industrial Base (DIB) Study. The study found defense business to have been less profitable, stable and predictable on an overall basis than commercial business during the 1967-74 period. Also, capital investment in defense-oriented companies was low. However, sufficient capacity to meet programmed demand still exists in most sections of the DIB.		